

# STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

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GOVERNOR

SECRETARY

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STATE PROJECT: 33501.1.1 (B-4152)

COUNTY:

Hoke

DESCRIPTION:

Bridge #53 on SR 1422 over Puppy Creek

SUBJECT:

Geotechnical Report – Bridge Foundation Investigation

This is a proposed bridge replacement job for bridge number 53 on SR 1422 over Puppy Creek. The new structure will occupy the same location as the existing structure but encompass a larger area. The proposed structure is a 21" cored slab design with 3 spans at 23', 54', and 23' respectively. The bridge is on a 90 degree skew and proposed bridge width is 30'.

Foundation test borings were performed with a CME-550X drill machine utilizing NW Casing, Tri-Cone roller bit, and automatic drop hammer. The field investigation for this project was conducted in November and December of 2004.

## Physiography/Geology

The project corridor is located in the Coastal Plain region of North Carolina in Hoke County just outside of the small town of Rockfish. Geologically the site is underlain by Cretaceous age coastal plain soils of the Middendorf Formation. Sands, cemented sandstones, mudstones and some clay soils, characterize the Middendorf Formation. Topography at the site is gently sloping to flat.

Site specific soils encountered were roadway fill, alluvium, and coastal plain in nature. Roadway fill soil associated with SR 1422 was encountered at all boring locations and consists of very loose to medium dense sand (A-2-4). Alluvial soils underlie roadway fill and consist of very soft to very stiff silt (A-4) and very loose to medium dense sand (A-2-4, A-3). Coastal plain soils are comprised of medium dense to very dense sands (A-2-4, A-3, A-2-6), and very stiff to hard high PI clay (A-7-6). In several boring instances 100+ BPF cemented sands (coastal plain sedimentary rock) were encountered in thicknesses of 2 to 6 feet. The occurrence of these very dense layers was documented between elevation 108 and 115 feet.

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## **Foundation Materials**

## End Bent 1:

This bent is located west of Puppy Creek. Two borings performed for this bent location encountered 6 to 10.5 feet of roadway fill comprised of very loose to medium dense graywhite sand (A-2-4) overlying alluvium. Alluvial soils were encountered between elevation 135 - 140 feet and consist of 10 to 15 feet of very soft to very stiff black and gray clayey sandy silt (A-4), and loose black-white silty sand (A-2-4, A-3). Significant organic content was noted in the upper 5 feet of the alluvium. Coastal plain soils occur below alluvium between elevation 125 - 130 feet. Coastal plain material consists of dense red-brown, tan, and gray sand (A-2-4, A-2-6, A-3) with coastal plain sedimentary rock between elevation 108 – 115 feet.

#### Bent 1:

Two borings were performed for this bent on the west end of the creek channel. Each boring encountered 4 to 9.5 feet of roadway fill soil consisting of loose to medium dense gray-white sand (A-2-4). Alluvial soils were encountered between elevation 136 - 141 feet and consist of 10 to 15 feet of soft to very stiff black and gray clayey sandy silt (A-4), and very loose to loose black-white silty sand (A-2-4, A-3). Significant organic content is present in the upper 5 feet of the alluvium. Coastal plain soils occur below alluvium at elevation 126 feet and consist of medium dense to very dense red-brown, tan, and gray sand (A-2-4, A-2-6, A-3), and very stiff to hard high PI gray silty clay (A-7-6). A hard layer of coastal plain sedimentary rock was encountered between elevation 108.5 – 111 feet.

#### Bent 2:

Two borings were performed along the top of the eastern bank for this bent location. Soils encountered begin with 5-10 feet of roadway fill comprised of very loose to loose tanbrown and gray sand (A-2-4). Elevation 125 – 140 marks the boundary change to alluvial soil which is composed of 10 feet of very loose to loose black silty sand, very stiff gray clayey sandy silt (A-4) and medium dense tan-brown sand with quartz gravel (A-3). The upper 5 feet of alluvium contains significant organic content. Coastal plain soils exist below alluvium and consist of medium dense to very dense tan-brown and gray clayey sand (A-2-4, A-2-6), and very stiff to hard high PI gray silty clay (A-7-6).

### End Bent 2:

This bent lies east of Puppy Creek. The two borings performed at this bent location encountered 5-9 feet of roadway fill consisting of very loose to loose tan-brown sand (A-2-4). Alluvium underlies fill between elevation 136 – 139.5 feet. The top 5 feet of alluvium is loose black silty sand (A-2-4) with organics, followed by medium dense tanbrown and gray clayey sand (A-2-4, A-3). The Coastal plain soils were encountered between elevation 125.5 - 129.5 feet and contain medium dense to very dense gray and tan-brown sand (A-2-4). A 1.5 foot layer of hard coastal plain sedimentary rock was encountered around elevation 108 – 110 feet.